

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES  
PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum  
Internationales Büro



(43) Internationales Veröffentlichungsdatum  
29. April 2004 (29.04.2004)

PCT

(10) Internationale Veröffentlichungsnummer  
WO 2004/035996 A1

(51) Internationale Patentklassifikation<sup>7</sup>: F01L 1/352,  
F16H 35/00, 25/06, F16D 3/10, B60N 2/225

(21) Internationales Aktenzeichen: PCT/EP2003/011082

(22) Internationales Anmeldedatum:  
7. Oktober 2003 (07.10.2003)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:  
102 47 204.1 10. Oktober 2002 (10.10.2002) DE

(71) Anmelder und

(72) Erfinder: KLINDWORTH, Jan [DE/DB]; Seestrass 3b,  
82418 Murrau (DE).

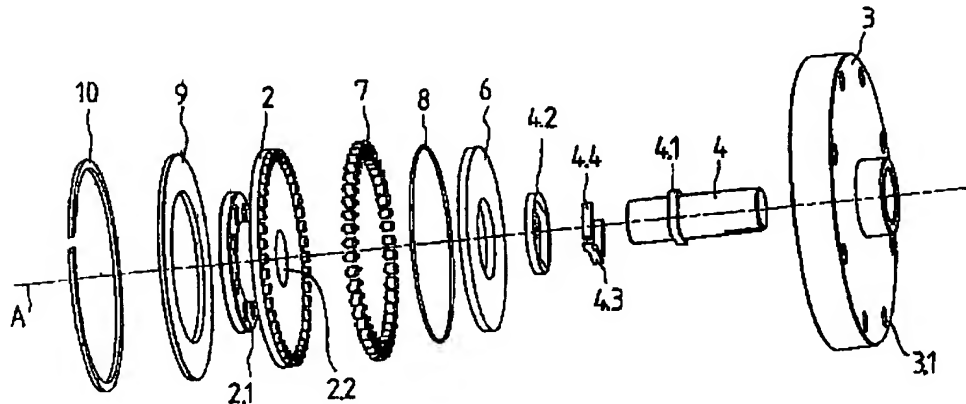
(81) Bestimmungsstaaten (*national*): AB, AG, AL, AM, AT,  
AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR,  
CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD,  
GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,  
KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN,  
MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU,  
SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,  
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Bestimmungsstaaten (*regional*): ARIPO-Patent (GH,  
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
eurasisches Patent (AM, AZ, BY, KG, KZ, MD, RU, TJ,  
TM), europäisches Patent (AT, BE, BG, CH, CY, CZ, DE,  
DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL,  
PT, RO, SE, SI, SK, TR), OAPI-Patent (BF, BJ, CF, CG,  
CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Fortsetzung auf der nächsten Seite]

(54) Title: DISPLACING DEVICE

(54) Bezeichnung: VERSTELLVORRICHTUNG



(57) Abstract: The invention relates to a device for displacing two part (2, 3) relative to each other, except a displacing device which is provided for displacing a camshaft. The aim of the invention is to create a displacing device which is easy and smooth to operate, is self-locking, and ensures a largely backlash-free, continuous displacement of the two parts at a high degree of efficiency. Said aim is achieved by providing the displacing device with a first part (2) comprising webs (2.3, 22.3) which are spaced apart in the circumferential direction and between which chambers (2.4) are embodied, a second part (3) comprising an internal toothing (3.2, 13.2), and several teeth (7, 27) that are disposed at a distance from each other in the circumferential direction within the chambers (2.4) and have an inner contact area (7.4) for resting against an eccentric drive member (6) as well as an outer contact area (7.5) for engagement with the interior toothing (3.2, 13.2). Rotary movements can be performed by the teeth (7, 27) located within the chambers (2.4) about axes of rotation that run parallel to the axis of rotation (A) of the parts (2, 3) when an input shaft (4) is rotated.

(57) Zusammenfassung: Die Erfindung betrifft eine Verstellvorrichtung zum Verstellen zweier Bauteile (2, 3) relativ zueinander, ausgenommen eine in eine Nockenwellenverstellung vorgesehene Verstellvorrichtung. Um bei einfacher und leichtgängiger Bedienbarkeit eine Selbsthemmung und zumindest weitgehend spielfreie, stufenlose Verstellung der zwei Bauteile mit hohem Wirkungsgrad zu gewährleisten, weist die Verstellvorrichtung auf ein erstes Bauteil (2) mit in Umfangsrichtung beabstandeten Stegen (2.3, 22.3), zwischen denen Kammern (2.4) ausgebildet sind, ein zweites Bauteil (3) mit einer Innenverzahnung (3.2, 13.2), und mehrere Zähne

[Fortsetzung auf der nächsten Seite]

WO 2004/035996 A1

**Veröffentlicht:**

— mit internationalem Recherchenbericht

*Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.*

---

(7, 27), die in Umfangsrichtung zueinander beabstandet in den Kammern (2.4) angeordnet sind, jeweils eine innere Anlagefläche (7.4) zur Anlage an einem exzentrischen Antriebsglied (6) und eine äußere Anlagefläche (7.5) zum Eingriff in die Innenverzahnung (3.2, 13.2) aufweisen, wobei bei Drehung einer Eingangswelle (4) von den Zähnen (7, 27) in den Kammern (2.4) Drehbewegungen um zu der Drehachse (A) der Bauteile (2, 3) parallele Drehachsen durchführbar sind.

## INTERNATIONAL SEARCH REPORT

PCT/EP 03/11082

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F01L1/352 F16H35/00 F16H25/06 F16D3/10 B60N2/225

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F01L F16H F02M F02D B60N F16D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
------------	--	-----------------------

A	US 5 643 128 A (KENNEDY OTHAR P) 1 July 1997 (1997-07-01)  column 1, line 8-15 column 1, line 24-38 column 3, line 21 -column 5, line 20	1-7, 14-16, 18,19,21
A	EP 0 211 687 A (RINEFAS LTD) 25 February 1987 (1987-02-25)  page 1, line 2-4 page 1, line 12-24 page 2, line 7-33 figures 1-5,9	1-7, 14-16, 18,19

-/--

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*Z\* document member of the same patent family

Date of the actual completion of the international search

23 January 2004

Date of mailing of the international search report

02/02/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Paquay, J

## INTERNATIONAL SEARCH REPORT

PCT/EP 03/11082

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category

Citation of document, with indication, where appropriate, of the relevant passages

Relevant to claim No.

A

DE 101 26 823 A (VOLKSWAGENWERK AG)  
14 February 2002 (2002-02-14)

column 0020 -column 0021  
column 0029 -column 0030  
figures 1-7

1-7,  
14-16,  
18, 19, 21

A

DE 195 08 328 A (KEIPER RECARO GMBH CO)  
19 September 1996 (1996-09-19)

cited in the application  
column 1, line 3-8  
column 2, line 22-35  
column 3, line 5-26  
column 3, line 47-52  
column 1-7

1-4,  
14-19, 21

A

GB 177 716 A (ANONIMA IND. RIUNITE CANTIERI  
D) 6 April 1922 (1922-04-06)  
page 1, line 13-21  
page 2, line 47 - line 99  
figures 2, 4

1-4, 13,  
17-19

A

US 5 718 480 A (SCHUELER ROELF ET AL)  
17 February 1998 (1998-02-17)  
column 1, line 4-9  
column 2, line 37 -column 3, line 34  
figures 1-4

1, 14-16,  
19, 21

## INTERNATIONAL SEARCH REPORT

PCT/EP 03/11082

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5643128	A	01-07-1997	NONE	
EP 0211687	A	25-02-1987	CN EP JP	86106253 A 0211687 A1 62098046 A
				13-05-1987 25-02-1987 07-05-1987
DE 10126823	A	14-02-2002	DE	10126823 A1
				14-02-2002
DE 19508328	A	19-09-1996	DE	19508328 A1
				19-09-1996
GB 177716	A	06-04-1922	NONE	
US 5718480	A	17-02-1998	EP DE JP	0755824 A1 59506900 D1 9103334 A
				29-01-1997 28-10-1999 22-04-1997